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Correlates for Utilization of Preventive Medicine Through the Use of Clinical Reminders at the Central Texas Veterans Health Care System

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Abstract

The purpose of this study was to identify variables that serve as predictors of a clinician's success in utilizing the clinical reminders software package to implement appropriate preventive medicine measures and meet performance standards. The sample consisted of 45 primary care clinicians practicing at the Central Texas Veterans Health Care System (CTVHCS). The relationship between fifteen predictor variables and two dependent variables (completion rate and success in meeting the performance measure) was assessed on a macro level and a micro level. Significant correlations at the macro level included: years out of professional school, gender, place of practice, patients treated per day, clinician's educational background, and clinician's age. At the micro level, significant correlations included: years practicing at the CTVHCS, years out of professional school, gender, patients treated per day, board certification, clinician's educational background, and clinician's age. The significant correlations and associated regression lines allowed the author to develop a clinician profile that identifies characteristics of clinicians more likely to utilize clinical reminders to implement preventive measures.

Table of Contents

List of Tables

List of Figures

Introduction

For years the healthcare industry has measured its efforts. During the proliferation of managed care, healthcare institutions began to measure the quality of their work. As healthcare expenditures began to rise and became the largest portion of the United States' gross domestic product, federal and private institutions began to analyze their delivery systems in order to identify improved methods for delivering care.

In the 1980s Medicare released data regarding the morbidity of patients who had undergone cardiac surgery. The data reflected wide variations in mortality rates at comparable facilities. In addition, health services researchers uncovered evidence of significant practice variations. These discoveries along with rising costs in healthcare costs led to the development of clinical practice guidelines (CPGs). By integrating the best available research evidence on various conditions, procedures, and treatment modalities, good practice guidelines supply clinicians with needed guidance and support. When properly implemented, guidelines have been shown to improve quality and improve the utilization of scarce medical resources (Zimmerman, 1997).

Over the last decade, many healthcare professionals began to subscribe to the benefits of utilizing practice guidelines. Hospitals, health maintenance organizations, professional organizations, and others have been developing CPGs. But, as healthcare organizations throughout the country have learned, developing guidelines is relatively simple compared to implementing them (Bauman, 1998).

The Veterans Health Administration (VHA) healthcare system is committed to implementing nationally developed, evidence based CPGs to improve the quality and efficiency of care provided to veterans. CPGs play a significant role in VHA's desire to

promote accountability and excellence in healthcare. In addition, CPGs are a primary component of VHA's performance measurement system (Department of Veterans Affairs, 2000).

One of the performance and measurement systems put in place was the VHA Prevention Index. This index measures each medical center's efforts to apply preventive measures to its primary care patients. The measures are based on CPGs that were developed based on scientific evidence and expert opinion. The preventive measures include relatively simple but effective preventive procedures including, but not limited to, prostate cancer screening, mammograms, ace inhibitor, aspirin therapy/cardiac ischemia, pneumococcal immunization, renal function in diabetics, depression screening, alcohol screening, and tobacco use screening. VHA established benchmarks ranging from 75 percent to 90 percent compliance with these measures. In order to comply with the measure, the specified percentage of veterans enrolled in each VHA healthcare system must receive the appropriate preventive care in order for the performance measure to be met.

The Central Texas Veterans HealthCare System (CTVHCS) utilizes a computerized patient medical record system (CPRS). One software program included in CPRS is the clinical reminders software package. The clinical reminders package alerts the clinician when a patient is due for one of the preventive measures. As an example, when a patient presents to his physician, the physician opens the patient's electronic record. If the patient is due for his annual prostate cancer screening the electronic medical record immediately notifies the physician with a pop-up message. The physician should then perform the prostate screening exam and upon completion

"click" the pop-up message that the screening has been completed. The information regarding completion or non-completion of the preventive measure is then stored in the patient's electronic medical record. Each clinician's compliance is monitored monthly to see if he is meeting the assigned performance measure goals. Clinicians receive feedback quarterly regarding their level of compliance.

The clinicians have received extensive training on the importance of meeting the performance measures and the utilization of the clinical reminders package. However, CTVHCS continues to be delinquent in its requirement to meet certain performance measures. Delinquency in meeting these measures has a negative impact on the quality of care being provided and also adversely affects the medical center director's performance rating.

Primary care services are delivered through three models in CTVHCS. Primary care services are delivered through three medical centers (mc), one satellite outpatient clinic (soc), and three community based outpatient clinics (cboc). The soc offers primary care services and other outpatient specialty services. The cbocs are staffed with two doctors and provide only primary care services at the site.

Problem Statement

Do the identified independent variables accurately predict success with clinician utilization of the clinical reminder software package to implement preventive health measures identified by the clinical reminders package?

Literature Review

A guideline is a practical, explicit process by which an individual plan of care is developed by a practitioner for a specific clinical condition or patient population based

on scientific evidence and expert opinion. Guidelines differ from standards or recommended practices in that they provide an individualized care plan for specific conditions or populations. There are five major purposes of a clinical practice guideline: to assist clinical decision-making by patients and practitioners; to educate individuals and groups; to assess and ensure quality of care; to allocate scarce resources to the most appropriate care; and to reduce the risk of legal liability related to negligent care. CPGs are systematically developed statements to assist the practitioner and patient in making decisions about appropriate care in specific clinical circumstances (Beyea, 2000).

In operational terms, CPGs minimize ineffective medical practices and maximize effective care, therefore, improving health outcomes. Guidelines provide the necessary evidence-based data to empower clinicians to make informed decisions and to minimize managerial influences to alter their practices in ways that may not be in the patient's best interest (Heffner, 2000).

The primary advantage of clinical practice guidelines is that they can describe an acceptable standard of care in situations where there has been substantial variation among clinicians. They can improve outcomes by improving awareness of the latest developments in care. Practice guidelines also lead to improvement in the health care delivery system. Clinical practice guidelines are tools, which operationalize the implementation of evidence-based practice (Brushwood, 2000).

Guidelines have the potential to empower consumers and better enable them to make intelligent choices. Guidelines not only assist practitioners in the decision making process, they can also provide patients with a framework for evaluating the

appropriateness of the care they are offered. A more knowledgeable patient may suffer from less anxiety and more quickly seek care. Guidelines may give patients the necessary tools to critically evaluate their care (Mead, 2000).

However, some have called CPGs “cook-book” medicine. There is concern that guidelines too often focus on cost rather than quality. From a libertarian standpoint, there is concern that CPGs focus too much on populations and not sufficiently on the needs of individuals. There is also concern that CPGs inhibit new thoughts and ideas. Clinicians at the "cutting edge" may be reluctant to use medications in new and promising ways, because guidelines do not promote such practices. Clinicians may be fearful that their innovations may be viewed as reckless and irresponsible if there are negative occurrences. Clinicians can be expected to be skeptical about innovative approaches that depart from guidelines if they believe their exposure to medical liability might increase (Brushwood, 2000).

Implementation of Clinical Practice Guidelines. The implementation of research findings into practice remains complex. Even when clinical effectiveness is supported by apparently rigorous evidence, this has still proved insufficient to produce corresponding changes in practice. Although it would be naive to suggest that evidence-based guidelines are the solution, they may be one tool to support the process (Mead, 2000).

It would be a mistake to entirely credit or blame clinicians for the success or failure of the implementation of CPGs. Successful implementation of CPGs involves all levels of a health care delivery system. Patients, providers, and organizations must work in unison for success. Patients can undermine their physicians' ability to implement guidelines if they lack confidence in the physicians or the guidelines. This

can be true if the guidelines are too complex for them to understand or they are unable or unwilling to access the treatment outlined in the guidelines. Providers will fail to implement guidelines they don't believe to come from credible sources. Providers will also be reluctant to utilize complex guidelines, guidelines that are significantly different than their standard practice, or if the provider's information/clinical systems hinder access to relevant information (Curry, 2000).

Strategies at the organizational level can address the majority of these concerns. These strategies may include the utilization of the organization's physicians in the committee that reviews new guidelines, restructuring the benefit and reimbursement policies for patients and providers who utilize best practices, and investment in clinical information systems. Clinicians identified endorsement by a renowned colleague or professional organization and the user friendliness of the guideline as the most important factors in determining the acceptance of the guideline (McAlister, Campbell, Zarnke, Levine, & Graham, 2001).

Building systems to implement guidelines is a process of innovation. There are five challenges to overcome in such organizational change. First, continuous motivation is needed for health care systems to adopt CPGs. Guidelines are implemented due to federal and/or state mandates; or it may be voluntary because of new standard practices; or improved efficiency. Second, the organizations strategic plan must drive the utilization of CPGs. Third, the development of CPGs must include all stakeholders including physicians, patients, payers, buyers, and the health delivery organization. Fourth, specific steps must be in place to guide the implementation in a deliberate and thoughtful way. These should clearly recognize the distinctiveness of the organization's

culture and structure. Fifth, organizations need specific measures in place to monitor implementation of the innovation (Sonnad, 1998).

It is easy to see that the implementation of these processes should proceed carefully. The guidelines must be integrated into the organization's overall strategic plan. There are four proposed stages requiring specific tactics for tackling each of these challenges. First, the organization must make adoption of guidelines a priority and must generate ideas for this implementation. Second, clinical and administrative resources should be brought to bear to ensure success. Third, the guideline's outcomes must be measurable. Fourth, a continuous monitoring or feedback loop must be installed and integrated into the organization's existing financial and/or quality operations (Curry, 2001).

Education. Education focusing on providers is a primary method used to further the use of CPGs and therefore improve outcomes. The educational objectives should include improving awareness of guidelines and the evidence supporting them; beliefs about appropriateness, feasibility and, effectiveness; and the necessary skill to implement guidelines with maximum effectiveness (Ockene, 2000).

The challenge is to design engaging educational strategies where effective skills are demonstrated at the appropriate level within realistic clinical situations. Although the majority of the training and education can be generic to any setting and population, opportunities are needed for providers to apply the training and information to their own particular populations and environments.

Education must be tailored to the attitudes, knowledge levels, and skills possessed by the clinicians for implementing the guidelines in order to be effective.

In order for providers to use the information they have, strategies must be developed that reinforce provider's use of guidelines. Clinical systems that incorporate patient-tracking and clinical reminders assist providers in modifying their practice patterns and implementing guidelines. The education of clinicians is necessary but not sufficient for the successful implementation of CPGs. Education along with the implementation of effective clinical systems is necessary in order to change the behavior of providers (Vogt, 1993).

In addition, management must create an organizational culture where the appropriate utilization of guidelines is encouraged and expected. Management must promote performance accountability, quality-assurance activities, and support information systems and staffing patterns that enhance implementation of guidelines. Design, application, and strategies that remind the provider in the practice setting to intervene and monitor the progress of patients are crucial to clinician behavior maintenance (Ockene, 2000).

It has been shown that one of the most vital components of a learning organization is the double-loop to learning approach. This entails a continuous feedback loop where the effects and results of an organization's approach is continuously modified based on feedback. According to the Hackman-Oldhan theory, there are three psychological factors that can improve motivation: (1) experienced meaningfulness, (2) experienced responsibility, and (3) knowledge of results. Therefore administrative and personnel strategies such as feedback loops and performance measures are needed to reinforce the use of CPGs. Because reminders, systems, and incentives are necessary it is important to include information about these strategies in

any educational activity, which is implemented to improve the utilization of CPGs (Jackson & Schuler, 2000).

In order to further the applications of clinician training, there is a need to systematically investigate and improve the numerous approaches that reinforce the practices and skills learned. Administrative and clinical leaders must be educated to enhance their understanding of how important leadership and organizational commitment are to the ultimate goal of improved outcomes.

Even when clinicians accept the need for guidelines and become educated in their appropriate utilization, other challenges interfere with the delivery and performance of the prescribed treatment. Patients presenting at the VHA are normally older and come from a lower socio-economic background than the average patient and, therefore, present with more multiple and complex problems. In addition, clinicians are required to educate their patients about life style choices such as smoking, alcohol consumption, and diet. It is crucial that clinicians be assisted in working in an efficient manner. In order to successfully implement the utilization of clinical guidelines, it is essential that sufficient support staff and technological support be made available to the clinicians.

Another challenge is the demands currently placed on providers. In today's environment, every minute and every penny is counted and analyzed in order to obtain maximum efficiency. There is a limited time physicians, nurses, and other clinicians have available to devote for education (Ockene, 2000).

There are numerous tools available to assist in the successful implementation and continued utilization of clinical practice guidelines. These tools include data information systems, recruitment of local medical opinion leaders to speak with the

clinicians regarding the positive outcomes associated with CPG utilization, performance measures, and continuing education. Effective implementation of guidelines requires that these tools be integrated application in a manner that effectively communicates best practices (Heffner, 2000).

National Acceptance of Clinical Practice Guidelines. A systematic review concluded that explicit guidelines do improve practice when introduced in the context of rigorous evaluation (Mead, 2000).

Federal agencies and professional organizations both develop CPGs. For the guidelines to be accepted and put into practice nationally, the quality of the evidence supporting the guideline is of the utmost importance. Most guidelines are developed from evidence gathered from large-scale clinical trials, observation, and expert opinion. Researchers should develop guidelines in the simplest form as possible to enhance utilization. Newly developed guidelines should be congruent with existing practice patterns. If recommendations dramatically vary from customary patterns of care, they should be supported with high quality evidence. Even then there will need to be a considerable effort put forth for guideline implementation. Finally the goals of the guideline should be explicit and measurable (Curry, 2000).

Professional organizations can facilitate the adoption of national guidelines in various ways. They can enhance the credibility of the guideline by endorsing them and assisting in changing current practices to align with new guidelines.

There is also relationship between the utilization of guidelines and the requirements of agencies providing accreditation. Accrediting organizations often use CPGs to develop benchmarks for assessing the quality of care. Regulatory and quality-

rating requirements strongly influence the clinical priorities of health care organizations (Curry, 2000).

Healthcare organizations and insurers encourage the utilization of guidelines through their benefit structures, the administrative and technological resources made available to clinicians, and the performance measures established for clinicians.

Managed care organizations and other insurers will have a significant impact on the development of national guidelines. Their reimbursement structure provides an impetus for guideline utilization. They determine whether and how much their benefit structures will cover the treatment recommended by the guideline. One of the most potent strategies for enhancing compliance with guidelines is through the incorporation of guideline related outcomes as performance accountability for evaluation and compensation. This could easily be integrated by health care organizations through their quality assurance programs (Crim, 2000).

Employers are the largest single healthcare purchasers in the United States. Purchasers are continually looking for new strategies to reduce the increasing rate of health care costs. These include limiting choices, sharing costs with employees, increasing out-of-pocket expenses and deductibles, and implementing self-insurance plans. Purchasers often look to published guidelines to assist in their negotiations with healthcare organizations. Purchaser coalitions can encourage managed competition where health plans compete on the basis of cost and quality. These cost and quality outcomes can be base on CPG recommendations (Barton, 1999).

Purpose of the Study

The purpose of this study is to evaluate variables to determine if the fifteen independent variables predict success in meeting the performance measures (implementation of preventive measures). The independent variables being studied are: years practicing medicine at the CTVHCS, years out of medical school, foreign medical school graduate or not, gender, the clinicians place of practice (cboc, soc or medical center), provider's profile (panel size), average number of patients seen per day, clinician degree (MD, DO, PA, APN), board certification or not, and clinician's age. If a correlation is found, the health care system will be able to identify make system modifications that should improve performance measurement compliance. Finding a correlation may also allow the health care system to predict if a newly hired clinician will meet the preventive health performance measurements. The alternate hypothesis is: "The identified variable(s) do have an affect on the clinician's utilization of the clinical reminders package. The null hypothesis is: The identified variable(s) do not have an affect on the clinician's utilization of the reminders package.

Ethical Concerns

When performing the research the anonymity of patients and clinicians will be maintained. The data provided to the researcher regarding the quantity of preventive measures "due" and "performed" will not contain names or any other patient identifiers. The data provided regarding the clinicians will be edited to remove all identifiers.

Methods and Procedures

When the clinician workload was analyzed it was necessary for the researcher to examine information that is specific to the patient and the clinician. This helped ensure

the reliability and the validity of the data. This process included manually examining the information contained in each clinician's official personnel record (OPF) and credentialing and privileging (C&P) file. Several patient records were also examined to ensure the reliability and validity of the information contained in CPRS. No further examination of patient or clinician specific information will be conducted.

Two objectives in experimental design are the elimination of systematic bias and the reduction of error variance. The primary reason for within-group variance is individual differences among the subjects. One method for reducing error variance is through the utilization of the analysis of covariance. In this analysis, repeated measures designs were utilized. By using repeated measures, variability among the subjects due to individual differences was removed from the error term (Stevens, 1996).

Sample and Data: Clinical reminders data covering the period April 1, 2001, through June 30, 2001 was used in this study. This is the first quarter in which the clinical reminders package was fully operational and all clinicians had received appropriate training. The Decentralized Hospital Computer Program (DHCP) and the Primary Care Management Module (PCMM) were utilized to collect workload and patient panel sized data for each clinician. Approximately 407,000 preventive measures were identified by the reminders package as being due during this three-month period. The subjects to be examined included forty-five primary care physicians, physician extenders, and advance practice nurses (n = 45). The OPF and C&P file of each clinician was reviewed to determine the number of years each clinician has been practicing medicine at the CTVHCS, the number of years out of medical school, whether the clinician was a foreign medical school graduate or not, gender, the clinician's place

of practice (cboc v soc v medical center), profession (physician v extender), board certification, and age.

Fifteen independent variables were identified. Two dependent variables were identified.

Five clinical reminders were chosen for the study. The reminders are prostate cancer screening, mammogram, ace inhibitor, aspirin therapy/cardiac ischemia, and pneumococcal immunization. These preventive measures were chosen because the PCP or extender can administer this preventive measure at the time the patient presents for care. Accomplishment of the measure is within the direct control of the clinician and does not require a consult or referral to a specialist.

Descriptive and inferential statistics were calculated for each independent and dependent variable using the Statistical Program for the Social Sciences (SPSS) to complete a correlation analysis. Correlation coefficients (Pearson's r) were calculated for each bivariate pair to assess the strength of the relationship and determine if the correlation is significant. Statistically significant results for any of the indicators will validate its use as a predictor of utilization of the clinical reminders package to implement appropriate preventive measures.

Operationalization of variables. The dependent variables are Y1, the percentage of preventive measures the clinician successfully completes and Y2, the clinician's successful implementation of the preventive measure as identified by the clinical reminder. Y1 is a continuous variable and Y2 is a dichotomous variable. Y2 is coded as one if the clinician met the goal for the preventive measure; it is coded as 0 if the clinician failed to meet the goal for the measure. As an example, during the period

under study, a clinician may have had 100 patients present for care that were due for a prostate exam. The clinician performed the exam on 75 patients. Therefore the clinician's completion rate was 75 percent, Y1 = .75. However, the goal for that period was an 80 percent completion rate of prostate exams due during that time period. Therefore, Y2 is coded as 0 because the clinician failed to meet the goal of 80 percent. The fifteen independent variables are tested against the dependent variables Y1 and Y2 independently.

The first and second independent variables, years practicing medicine and years out of medical school, are continuous variables measured in years (practicing for seven years coded as 7, practicing five years coded as 5, etc). The third independent variable, foreign medical school graduate is a dichotomous variable. If the clinician graduated from a foreign medical school it is coded as 1, it is coded as 0 otherwise. The fourth independent variable, gender, is a dichotomous variable. If the clinician is a male it is coded as 1, it is coded as 0 otherwise. The fifth through seventh independent variables are dichotomous variables. These variables will be coded in the following method: practicing at a cboc it is coded as 1, it is coded as 0 otherwise; practicing in soc it is coded as 1, it is coded as 0 otherwise; practicing at a medical center coded as 1, it is coded as 0 otherwise. The eighth independent variable, provider profile, is a continuous variable measured as the number of patients assigned to that particular provider's profile. The ninth independent variable, average number of patients seen per day, is a continuous variable and represents the average number of patients seen per workday within the three-month period under study. The tenth through thirteenth independent variables are dichotomous variables. If the clinician is a medical doctor

coded as 1, it is coded as 0 otherwise; if the clinician is a doctor of osteopath coded as 1, it is coded as 0 otherwise; if the clinician is a physician assistant coded as 1, it is coded as 0 otherwise, if the clinician is an advance practice nurse coded as1, it is coded as 0 otherwise. The fourteenth independent variable is dichotomous. If the clinician is certified by a national certifying body it is coded as 1, it is coded as 0 otherwise. The fifteenth independent variable, clinician's age, is a continuous variable.

Results

Graph 1, CTVHCS Macro and Micro Analysis of Completion Rate (Y1) of the Performance Measure and Goals for Each Prevention Measure, reflects a macro view of CTVHCS success in meeting the established defined goal for each preventive measure. The graph also reflects each site's compliance with the established goals. The cbocs clinicians are meeting the completion rate for two of the five goals; the satellite clinic clinicians are meeting none of the five goals; and the medical center clinicians are meeting two of the five goals. Graph 2, CTVHCS Macro and Micro Analysis of Successful Completion (Y2) of the Performance Measure and Goals for Each Prevention Measure, reflects a Macro view of CTVHCS success in meeting the established defined goal for each preventive measure. The graph also reflects each site's success in meeting the established goals. No sites met the designated goals for the three months under study.

Table 1 presents descriptive statistics for the Y1 outcome variable. The overall completion rate for the measures (Y1) is 74.32 percent. The health care system is successful (Y2) in meeting the assigned performance measure 35.56 percent of the time. The clinician's average number of years practicing at the CTVHCS was 5.31

years with a standard deviation of 4.84 years. The clinician's had graduated from medical school an average of 18.93 years ago with a standard deviation of 11.95 years. Of the clinician's in the study, 40.44 percent are foreign medical graduates. The clinician staff consists of 56.00 percent male and 44.00 percent female. Of the clinicians in the CTVHCS, 8.89 percent practice at a community based outpatient clinic, 31.11 percent practice at a satellite outpatient clinic, and 60.00 percent practice at a medical center. On average, the clinicians maintain a provider profile of 1172.39 patients with a standard deviation of 254.77 patients. The clinicians treat approximately 13.36 patients per day with a standard deviation of 2.64 patients. Of the forty-five clinicians in primary care, 71.56 percent are medical doctors, 8.89 percent are doctors of osteopath, 8.84 percent are physician assistants and 11.10 percent are advance practice nurses.

A correlation coefficient matrix was created using SPSS software. Pearson's r correlations for the dependent variables (Y1 completion rate and Y2 success in meeting the performance standard goal) and each of the fifteen independent variables were computed. The results in Table 1 reflect the correlation matrix for the entire health care system using the dependent variable Y1, completion rate, and the fifteen independent variables. Years out of medical school ($r = .142$, $p <= .05$), satellite outpatient clinic ($r = -.384$, $p <= .01$), medical center ($r = .319$, $p <= .01$), number of patients seen per day ($r = .157$, $p <= .05$), doctor of osteopath ($r = .133$, $p <= .05$), and clinician age ($r = .172$, $p <= .01$) had a significant correlation with completion rate. Table 2 reflects the results of the correlation matrix for the health care system using the dependent variable Y2, success in meeting the performance measure, and the fifteen independent variables. Years

practicing at the CTVHCS (r = .133, p<= .05), years out of medical school (r = .285, p<= .01), gender (r = .191, p<= .05), satellite outpatient clinic (r = -.279, p<= .01), medical center (r = .186, p<= .01), doctor of osteopath (r = .156, p<= .05), physician assistant (r = -.1588, p<= .05), and clinician's age (r = .233, p<= .01) had a significant correlation with successfully meeting the performance measure.

Graphs 9 – 13, Macro Analysis. Regression Lines for CTVHCS Y1, Completion Rate (%) and Each Significant Correlation, reflect the computation of a regression line for the independent variables that had a significant correlation with the dependent variable Y1, Completion Rate. Each of the graphs reflects a positive correlation between the independent variable and Y1 with the exception of Graph 10. The regression line in Graph 10 shows a negative correlation between the dependent variable Y1 and the independent variable, practices at an SOC.

Graphs 14 – 19, Macro Analysis. Regression Lines for CTVHCS Y2, Success in Meeting the Performance Standard and Each Significant Correlation, reflect the computation of a regression line for the independent variables that had a significant correlation with the dependent variable Y2, Success in Meeting the Performance Standard. Each of the graphs reflects a positive correlation between the independent variable Y2 with the exception of Graphs 17 & 19. Both these graphs reflect a negative correlation between the dependent variable Y2 and practicing at the SOC and practicing as a Physician Assistant, respectively.

A microanalysis was performed to determine the compliance at each primary care delivery model (cboc, soc, mc). Descriptive statistics for the cboc sites is contained in Table 3. The Y1 completion rate at the cbocs was 78.38 percent and the

Y2 success rate was 55.00 percent. The clinicians had been practicing at the cboc on average 5.25 years with a standard deviation of 2.81 years. The mean years out of medical school at the cbocs was 17.53 years with a standard deviation of 10.20 years. The gender mix at the cbocs is 75.00 percent male and 25.00 percent female. On average the clinicians maintain a profile of 1143.24 patients with a standard deviation of 127.61 patients and treat 14.45 patients per day with a standard deviation of 1.25 patients treated per day. The cboc staff consists of 25 percent medical doctors and 75 percent doctors of osteopath. Seventy-five percent of the clinicians are board certified. The average age of the cboc clinicians is 45.83 years with a standard deviation of 9.02 years.

Table 4, Micro Analysis, descriptive statistics for soc reflects a completion rate (Y1) of 64.61 percent and a success rate of 15.70 percent at the soc. On average, the clinicians have been practicing at the soc 4.08 years with a standard deviation of 3.70 years and have been out of medical school 17.27 years with a standard deviation of 7.80 years. The soc clinician staff consists of 14.29 percent foreign medical school graduates, 64.29 percent males, and 35.71 percent females. On average the clinicians carry a profile of 1240.74 patients and treat 12.21 patients per day with a standard deviation of 364.53 and 3.06 patients respectively. The soc clinician staff consists of 78.57 percent medical doctors, 7.14 percent doctors of osteopath, 0.00 percent physician assistants, and 14.29 percent advance practice nurses. Ninety-two percent of the staff is board certified. The average age of the clinician staff is 45.12 years with a standard deviation of 7.23 years.

Table 5, Micro Analysis, descriptive statistics for mc reflects a completion rate (Y1) of 80.09 percent and a success rate (Y2) of 42.96 percent at the mc. On average, the clinicians have been practicing at the mc 6.323 years with a standard deviation of 5.46 years and have been out of medical school 20.01 years with a standard deviation of 12.63 years. The mc clinician staff consists of 55.56 percent foreign medical school graduates, 48.15 percent males, and 51.85 percent females. On average the clinicians carry a profile of 1141.26 patients and treat 13.80 patients per day with a standard deviation of 187.82 and 2.40 patients respectively. The mc clinician staff consists of 74.07 percent medical doctors, 0.00 percent doctors of osteopath, 14.81 percent physician assistants, and 11.11 percent advance practice nurses. Ninety-two percent of the staff is board certified. The average age of the clinician staff is 49.72 years with a standard deviation of 8.54 years.

Table 6. Micro Analysis. Correlation coefficients for Y1, completion rate and the independent variables at each site for each preventive measure, reflects significant correlations at the cbocs for the preventive measure prostate as being board certification ($r = .996$, $p <= .05$). At the cbocs significant correlations were found between Y1 and the mammography measure for the independent variables gender ($r = .998$, $p <= .01$) and board certification ($r <= .999$, $p <= .01$). Significant correlations were found between Y1 and the ace inhibitor measure at the cboc for years working at the cboc ($r = -.986$, $r <= .01$), and clinician's age ($r <= -.890$, $p <= .01$). Significant correlations at the cbocs for the aspirin therapy measure was years working at the cboc ($r = -.996$, $p <= .01$), years out of medical school ($r = -.928$, $p <= .01$), patients seen/day ($r = -.947$, $p <= .01$), and clinician's age ($r = -.974$, $p <= .05$). Significant correlations at

the cbocs for the pneumonia vaccine measure were years working at the cboc (r = -.984, p <= .01), years out of medical school (r = -.928, p <= .01), and clinician's age (r = -.999, p <= .01).

Table 6 also reflects the significant correlations at the soc site. There were no significant correlations for the prostate screening measure. The significant correlation for the mammography measure was years out of medical school (r = .506, p <= .05) and clinician's age (r = .636, p <= .01). The significant correlation at the soc for the ace inhibitor measure was foreign medical graduate (r = -.607, p <= .05). There were no significant correlations at the soc for the aspirin therapy or pneumonia vaccine measures.

Table 6 reflects correlations at the mc sites. Significant correlations for the prostate measure were years working at mc (r = .362, p <= .05), years out of medical school (r = .475, p <= .01) and clinican's age (r = .350, p <= .05). The only significant correlation at the mc for the mammography measure was years working at mc (r = -.319, p <= .05). There were no significant correlations for the ace inhibitor or aspirin therapy measure. The significant correlations at the medical center for the pneumonia vaccine measure were years working at mc (r = .377, p <= .05), years out of medical school (r = .502, p <= .01), medical doctor (r = .329, p <= .05), and clinician's age (r = .531, p <= .01).

Table 7. Micro Analysis. Correlation coefficients for Y2, successful, and the independent variables at each site, for each preventive measure reflects significant correlations at the cboc sites for prostate screening and mammography were gender (r = 1.000, p <= .01) and board certification (r = 1.000, p <= .01). For the ace inhibitor

measure at the cbocs the significant correlation was clinician's age (r = -.948, p <= .01). There was no significant correlation for the aspirin therapy measure. The significant correlation at the cbocs for the pneumonia vaccine measure was clinician's age (r = -.948, p <= .05).

Table 7 also reflects the significant correlations at the soc site. There was one significant correlation at the soc for prostate screening which was doctor of osteopath (r = 1.000, p <= .01). The significant correlation at the soc for mammography was clinician's age (r = .571, p <= .05). There were no significant correlations at the soc for the ace inhibitor or the aspirin therapy measures. The significant correlation for the pneumonia vaccine was doctor of osteopath (r = .531, p <= .05).

Table 7 reflects correlations at the mc sites. Significant correlations for the prostate measure were physician assistant (r = -.503, p <= .01), advance practice nurse (r = .293, p <= .01), and clinician's age (r = .355, p <= .05). The significant correlation at the mc for the mammography measure was years out of medical school (r = .321, p <= .05). Significant correlations for the ace inhibitor measure were years working at the mc (r = .367, p <= .05), years out of medical school (r = .659, p <= .01), gender (r = .419, p <= .05), and clinician's age (r = .536, p <= .01). There were no significant correlations for the aspirin therapy measure. The significant correlations at the mc for the pneumonia vaccine measure were years working at the mc (r = .427, p <= .05), years out of medical school (r = .416, p <= .05), and clinician's age (r = .469, p <= .05).

Graphs 20 – 23, Micro Analysis. Regression Lines for CBOC Y1, Completion Rate (%) and Each Significant Correlation, reflect the computation of a regression line for the independent variables identified in Table 6 that had a significant correlation with

the dependent variable Y1 Completion Rate at the cboc sites. As the graphs illustrate, only the independent variable board certification had a positive correlation with the dependent variables. The other regression lines illustrated had a negative correlation with completion rate.

Graphs 24 – 26, Micro Analysis. Regression Lines for CBOC Y2, Successful and Each Significant Correlation, reflect the computation of a regression line for the independent variables identified in Table 6 that had a significant correlation with the dependent variable Y2 Success at the cboc sites. The three independent variables had a positive correlation with Y2 with the exception of clinician's age.

Graphs 27 – 29. Micro Analysis. Regression Lines for SOC Y1 Completion Rate (%) and Y2, Successful and Each Significant Correlation, reflect the computation of a regression line for the independent variables identified in Tables 6 and 7 that had a significant correlation with the dependent variables Y1 and Y2 at the soc site. The three independent variables illustrated have a positive correlation with Y1 with the exception of foreign medical graduate, which had a negative correlation. Graph 30 reflects the positive relationship between the dependent variable Y2 and the independent variable clinician's age.

Graphs 31 – 36. Micro Analysis. Regression Lines for MC Y1 Completion Rate (%) and Y2, Successful and Each Significant Correlation, reflect the computation of a regression line for the independent variables identified in Tables 6 and that had a significant correlation with the dependent variables Y1 and Y2 at the mc site. The regression line of all six graphs reflects a positive correlation between the dependent variable and the identified independent variable.

Discussion

The purpose of this study was to determine if the identified independent variables were valid indicators of success in the clinicians use of clinical reminders to implement preventive medicine measures. It was hypothesized that the variables would be shown to be predictors of success in implementing preventive measures and meeting the performance measures. The results of this study indicate that the independent variables that have a significant correlation with completing the preventive measure are: years out of medical school, practicing in a medical center setting, number of patients treated per day, doctors of osteopath, and clinician's age. The results of this study indicate that the independent variables that have a significant correlation with successfully meeting the performance measure are: years practicing at CTVHCS, years out of medical school, gender, practicing in a medical center setting, doctors of osteopath and clinician's age. The other independent variables were not shown to have significant correlations with the dependent variables.

It is of interest to note that practicing at the soc showed a strong negative correlation with both dependent variables. It could be hypothesized that making improvements in compliance at the soc would have a strong positive impact on the performance of the healthcare system as a whole. The soc currently accounts for 27 percent of the health care system's outpatient workload.

The study also showed that those clinicians practicing as a DO were more likely to be successful in completing the preventive measures and meeting the performance measure. This requires further study. There are only four doctors of osteopath

practicing in the CTVHCS. Therefore given the low sample size (n = 4 DO), it is difficult to draw any conclusions with a required level of confidence.

On a macro level, review of the significant correlations and the associated regression lines suggests an ideal clinician profile. The study suggests that the clinician more likely to utilize the clinical reminders to implement preventive medicine measures and therefore meet the performance standard has the following characteristics: is a medical doctor, practices in a medical center setting, is 20.3 years out of medical school, treats 14.4 patients per day, and is approximately 52 years old.

On a micro level, review of the significant correlations and the associated regression lines suggests an ideal clinician profile at each site. The study suggests that at a cboc the clinician more likely to utilize the clinical reminders to implement preventive medicine measures and therefore meet the performance standard has the following characteristics: has worked at the CTVHCS less than 6 years, graduated professional school less than 15 years ago, is male, is board certified, and is less than 46 years of age. It should be noted that during this study the sample size of clinicians practicing at a cboc was small (n = 4). Therefore it is difficult to draw conclusions at the cboc with a high level of confidence.

Review of the significant correlations and the associated regression lines at the soc does not provide an ideal clinician profile. Given the low completion rate and low success rate at the soc, a clinician profile could not be developed that would suggest success in meeting the performance standards.

For those practicing in a medical center setting, review of the significant correlations and the associated regression lines suggests the clinician more likely to

utilize the reminders package to meet the performance standard has the following characteristics: has practiced at the CTVHCS more than 15 years, has been a graduate of professional school for more than 17 years, and is over 50 years of age.

The results of the study could be used to identify those clinicians most at risk for not implementing preventive measures and therefore not meeting the performance standards. This will allow management to identify those individuals who may need additional training and reinforcement and provide that needed assistance. Identifying those clinicians at most risk and making those clinicians more aware of the need to practice preventive medicine should improve the quality of care provided to patients and improve the health care system's success in meeting the performance measures.

Conclusion

On a macro level, the clinicians more likely to be successful in utilizing the reminders package to implement preventive measures are medical doctors, practice in a medical center setting, treat 14.4 patients per day, and are over 52 years of age. Those clinicians not possessing these characteristics are more likely not to implement preventive medicine measure through the reminders package and therefore not meet the performance standards.

At the cboc, years practicing at the CTVHCS, years out of professional school, gender, board certification, and clinician's age had significant correlations with completion rate and success.

At the medical center, years practicing at the CTVHCS, years out of professional school, and clinician's age had significant correlations with completion rate and success.

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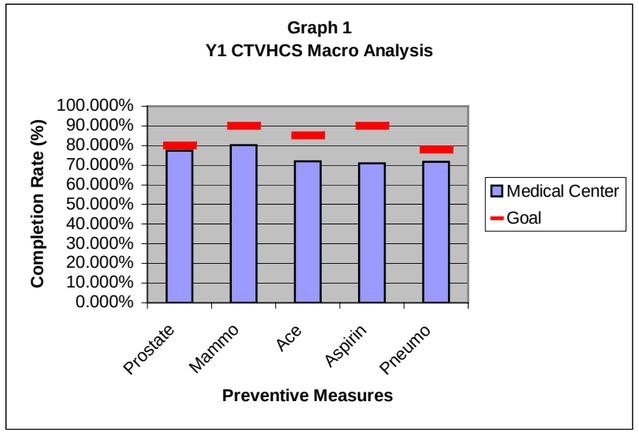
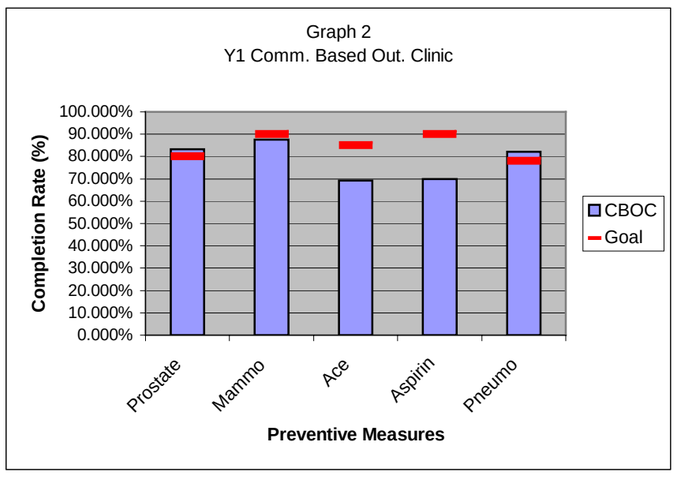
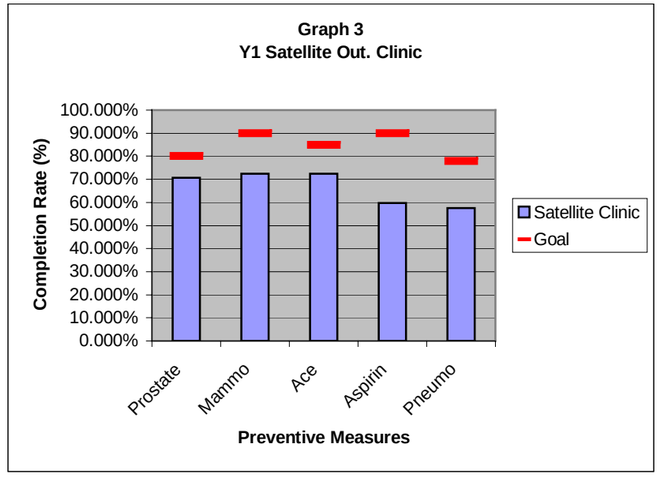
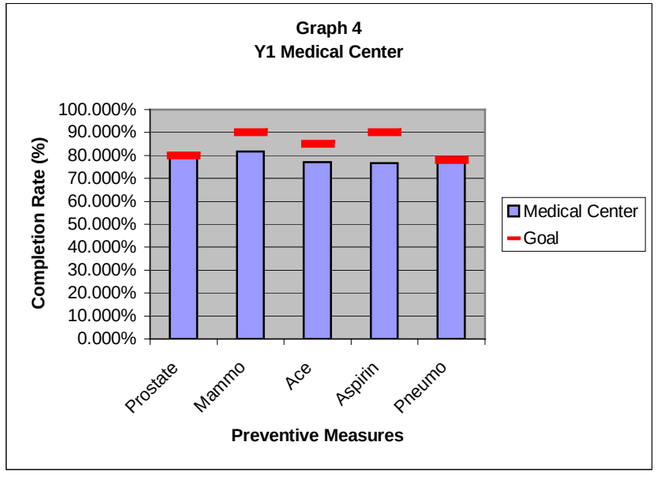
Graphs 1 - 4. CTVHCS Macro and Micro Analysis of Completion Rate of the Performance Measure (Y1) and Goals for Each Prevention Measure for the period 4/1/01 thru 6/30/01

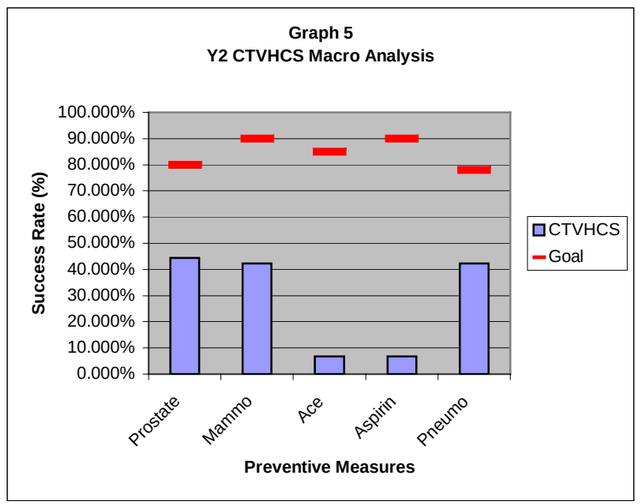


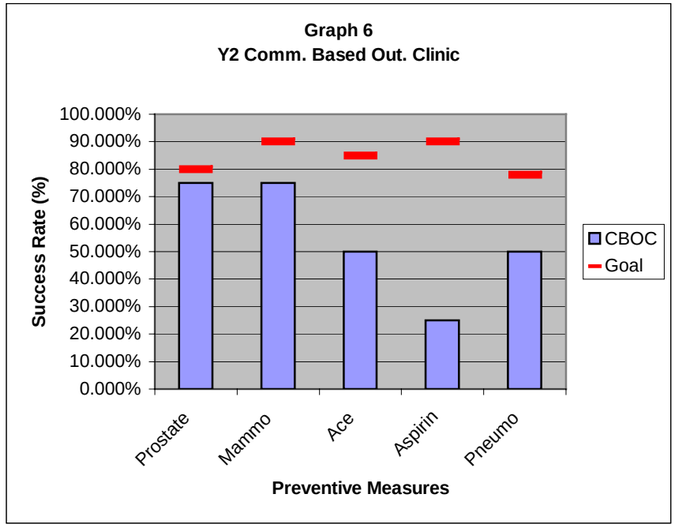


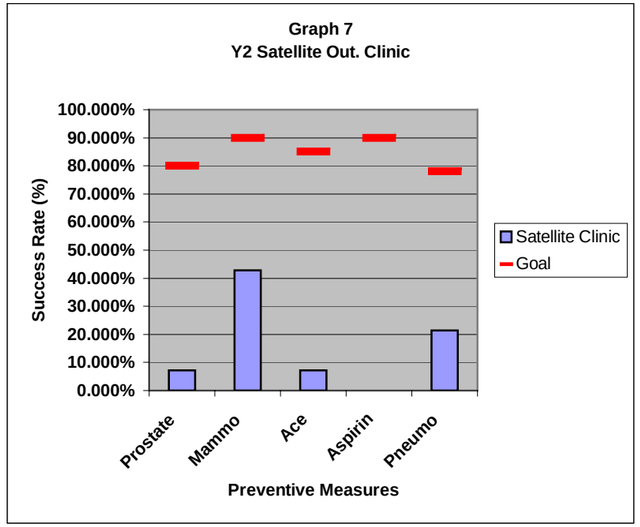




Graphs 5 - 8. CTVHCS Macro and Micro Analysis of Successful Completion of the Performance Measure (Y2) and Goals for Each Prevention Measure for the period 4/1/01 thru 6/30/01







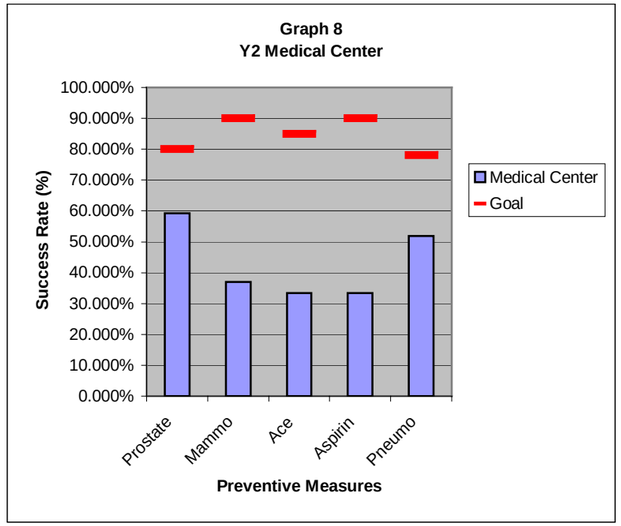


Table 1. Descriptive statistics of the outcome, Y1 Completion Rate, and predictor variables for implementing the preventive measure, using clinical reminders throughout the Central Texas Veterans Health Care System.

	%	$\bar{x}$	Std Dev.	Pearson's r
Dependent Variables				
Y1 Completion Rate	74.319			
Independent Variables				
Yrs Prac Med at CTVHS		5.312	4.838	.0721
Years out of Med School		18.933	11.047	.1419*
FMG	40.444			.0545
Gender				.0693
Male	56.000			
Female	44.000			
Place of Practice				
CBOC	8.891			.0744
SOC	31.111			-.3835**
Med Ctr	60.000			.3192**
Provider Profile		1172.387	254.770	.0056
Avg Number Pat/Day		13.362	2.638	.1566*
Profession				
MD	71.560			-.0123
DO	8.893			.1331*
PA	8.445			-.0556
APN	11.102			-.0407
Board Certified	80.000			-.0478
Age		47.942	8.374	.1719**

n = 45 primary care clinicians, * correlation significant, p <= .05, correlation significant, p< = .01

Table 2. Descriptive statistics of the outcome, Y2 Successful or Not, and predictor variables for successful in meeting the performance standard throughout the Central Texas Veterans Health Care System.

	%	$\bar{x}$	Std Dev.	Pearson's r
Dependent Variables				
Y2 Successful or Not	35.561			
Independent Variables				
Yrs Prac Med at CTVHS		5.312	4.838	.1331*
Years out of Med School		18.933	11.047	.2849**
FMG	40.444			.1257
Gender				.1907*
Male	56.000			
Female	44.000			
Place of Practice				
CBOC	8.891			.1269
SOC	31.111			-.2786**
Med Ctr	60.000			.1895**
Provider Profile		1172.387	254.770	-.0956
Avg Number Pat/Day		13.362	2.638	.0333
Profession				
MD	71.560			.0361
DO	8.893			.1595*
PA	8.445			-.1588*
APN	11.102			-.0558
Board Certified	80.000			.4884
Age		47.942	8.374	.2331**

n = 45 primary care clinicians; * correlation significant, p <= .05, correlation significant, p<=.01

Table 3. Micro Analysis, descriptive statistics for CBOC

	%	$\bar{x}$	Std Dev.
Dependent Variables			
Y1 Completion Rate	78.379		
Y2 Successful or Not	55.000		
Independent Variables			
Yrs Prac Med at CTVHS		5.251	2.813
Years out of Med School		17.531	10.196
FMG	25.000		
Gender			
Male	75.000		
Female	25.000		
Provider Profile		1143.238	127.606
Avg Number Pat/Day		14.450	1.245
Profession			
MD	25.000		
DO	75.000		
PA	0.000		
APN	0.000		
Board Certified	75.000		
Age		45.833	9.019

n = 4 primary care clinicians

Table 4. Micro Analysis, descriptive statistics for SOC

	%	$\bar{x}$	Std Dev.
Dependent Variables			
Y1 Completion Rate	64.611		
Y2 Successful or Not	15.700		
Independent Variables			
Yrs Prac Med at CTVHS		4.077	3.696
Years out of Med School		17.268	7.804
FMG	14.290		
Gender			
Male	64.293		
Female	35.707		
Provider Profile		1240.743	364.531
Avg Number Pat/Day		12.210	3.055
Profession			
MD	78.571		
DO	7.143		
PA	0.000		
APN	14.292		
Board Certified	92.860		
Age		45.124	7.230

n = 14 primary care clinicians

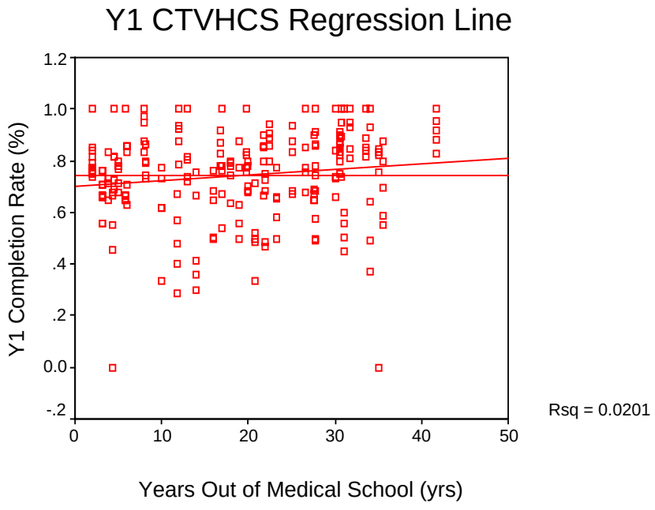
Table 5. Micro Analysis, descriptive statistics for MC

	%	$\bar{x}$	Std Dev.
Dependent Variables			
Y1 Completion Rate	80.090		
Y2 Successful or Not	42.961		
Independent Variables			
Yrs Prac Med at CTVHS		6.323	5.461
Years out of Med School		20.009	12.631
FMG	55.560		
Gender			
Male	48.151		
Female	51.849		
Provider Profile		1141.261	187.823
Avg Number Pat/Day		13.800	2.396
Profession			
MD	74.070		
DO	0.000		
PA	14.810		
APN	11.111		
Board Certified	74.075		
Age		49.715	8.542

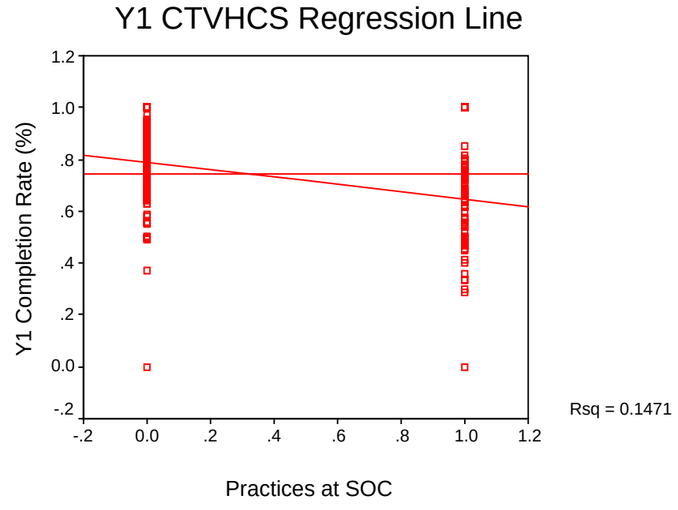
n = 27 primary care clinicians

Graphs 9 – 13. Macro Analysis. Regression Lines for CTVHCS Y1, Completion Rate (%) and Each Significant Correlation

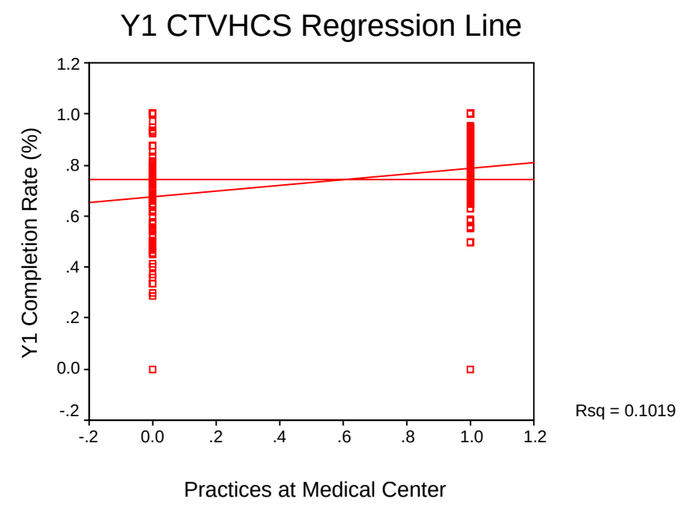
Graph 9



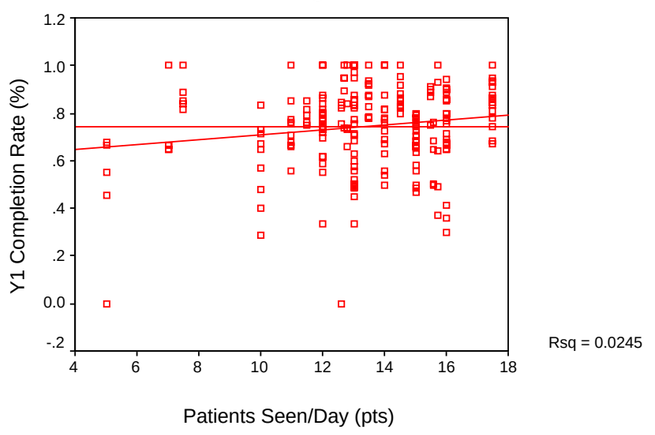
Graph 10



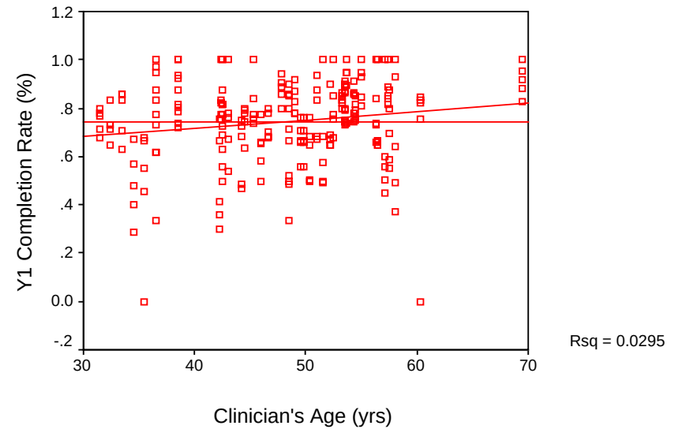
Graph 11



Graph 12

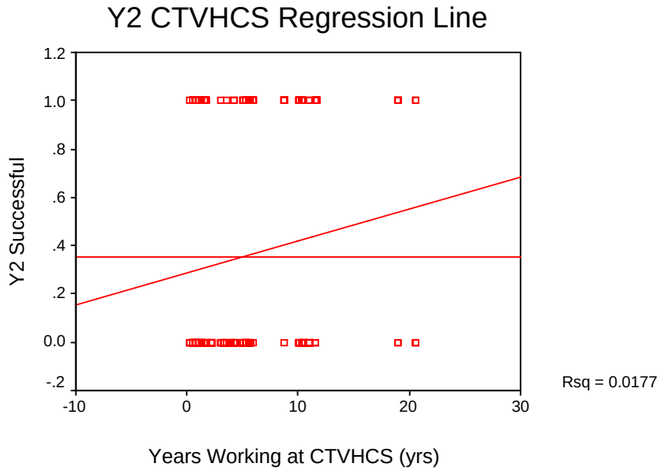


Graph 13

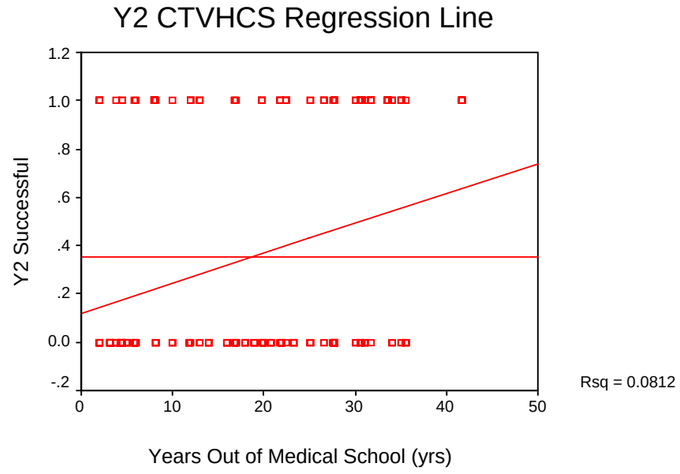


Graphs 14 – 19. Macro Analysis. Regression Lines for CTVHCS Y2, Successful and Each Significant Correlation

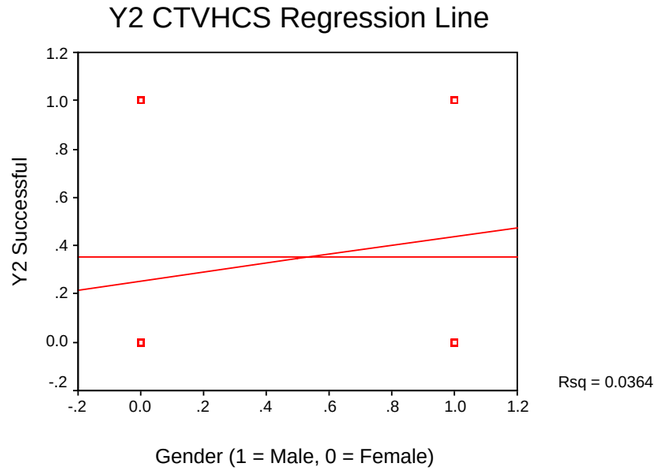
Graph 14



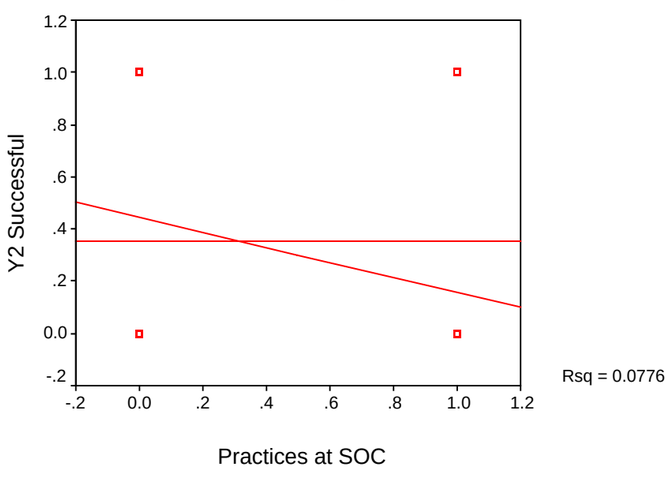
Graph 15



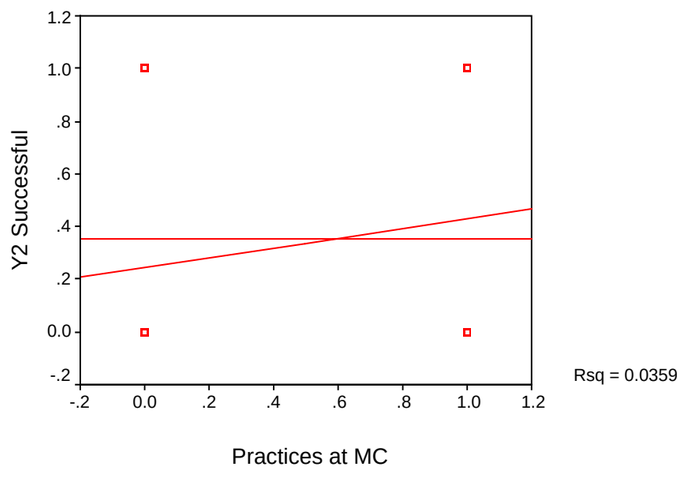
Graph 16



Graph 17



Graph 18



Graph 19

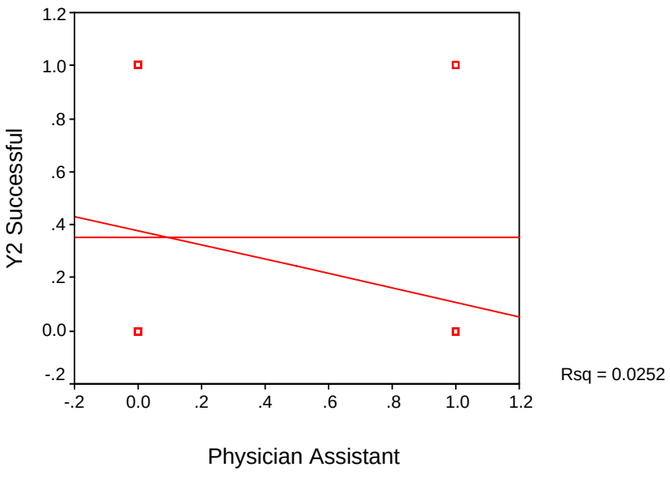


Table 6. Micro Analysis. Correlation coefficients for Y1, completion rate and the independent variables at each site for each preventive measure.

Y1 Correlation Coefficients

	Prostate	Mammo	Ace Inhibitor	Aspirin Rx	Pneumo Vac
Comm. Based Clinic n = 4 pc clinicians	EOD = -.198 YOMS = .045 FMG = .304 Gender = .996 Prov Prof = -.886 Pats/Day = -.582 MD = .304 DO = -.304 PA = NA APN = NA **Bd Cert = .996*** Age= -.329	EOD = -.156 YOMS = .087 FMG = .333 **Gender = .998**** Prov Prof = -.830 Pats/Day = -.547 MD = .333 DO = -.333 PA = NA APN = NA **Bd Cert = .999*** Age= -.295	**EOD = -.986**** YOMS = -.969 FMG = -.897 Gender = .119 Prov Prof = .110 Pats/Day = -.883 MD = -.897 DO = .897 PA = NA APN = NA Bd Cert = .119 **Age= -.890****	**EOD = -.996**** **YOMS = -.987**** FMG = -.906 Gender = .275 Prov Prof = -.042 **Pat/Day = -.947*** MD = -.906 DO = .906 PA = NA APN = NA Bd Cert = -.075 **Age= -.974***	**EOD = -.984**** **YOMS = -.928**** FMG = -.814 Gender = .275 Prov Prof = -.042 Pats/Day = -.947 MD = -.814 DO = .814 PA = NA APN = NA Bd Cert = -.275 **Age= -.999****
Satellite Clinic n = 14 pc clinicians	EOD = -.065 YOMS = -.134 FMG = -.219 Gender = .295 Prov Prof = .065 Pats/Day = .223 MD = -.015 DO = .416 PA = NA APN = -.288 Bd Cert = -.317 Age= -.403	EOD = .103 **YOMS = .506*** FMG = .198 Gender = .160 Prov Prof = .421 Pats/Day = .400 MD = .097 DO = .241 PA = NA APN = -.290 Bd Cert = -.241 **Age= .636****	EOD = -.140 YOMS = .013 **FMG = -.607*** Gender = .047 Prov Prof = .067 Pats/Day = -.205 MD = -.261 DO = .268 PA = NA APN = .109 Bd Cert = .210 Age = .044	EOD = -.070 YOMS = .065 FMG = -.409 Gender = .258 Prov Prof = .099 Pats/Day = .128 MD = -.064 DO = .259 PA = NA APN = -.115 Bd Cert = -.349 Age= .133	EOD = -.119 YOMS = -.105 FMG = -.447 Gender = .200 Prov Prof = .022 Pats/Day = -.134 MD = -.325 DO = .411 PA = NA APN = .079 Bd Cert = -.163 Age= .066
Medical Center n = 27 pc clinicians	**EOD = .362*** **YOMS = .475**** FMG = .125 Gender = -.097 Prov Prof = -.037 Pats/Day = .223 MD = .360 DO = NA PA = -.541 APN = .109 Bd Cert = .211 **Age= .350***	**EOD = -.319*** YOMS = -.020 FMG = -.161 Gender = -.021 Prov Prof = -.087 Pats/Day = -.042 MD = -.027 DO = NA PA = -.154 APN = .211 Bd Cert = .196 Age= -.069	EOD = .154 YOMS = .213 FMG = .086 Gender = .046 Prov Prof = -.081 Pats/Day = .050 MD = .152 DO = NA PA = -.212 APN = .028 Bd Cert = -.259 Age= .230	EOD = .041 YOMS = .066 FMG = .052 Gender = .185 Prov Prof = .150 Pats/Day = .070 MD = .149 DO = NA PA = -.098 APN = -.078 Bd Cert = -.050 Age= .093	**EOD = .377*** **YOMS = .502**** FMG = -.010 Gender = .137 Prov Prof = -.011 Pats/Day = .175 **MD = .329*** DO = NA PA = -.283 APN = -.139 Bd Cert = -.111 **Age= .531****

* correlation significant, p<=.05 **correlation significant, p<=.01

Table 7. Micro Analysis. Correlation coefficients for Y2, successful, and the independent variables at each site, for each preventive measure.

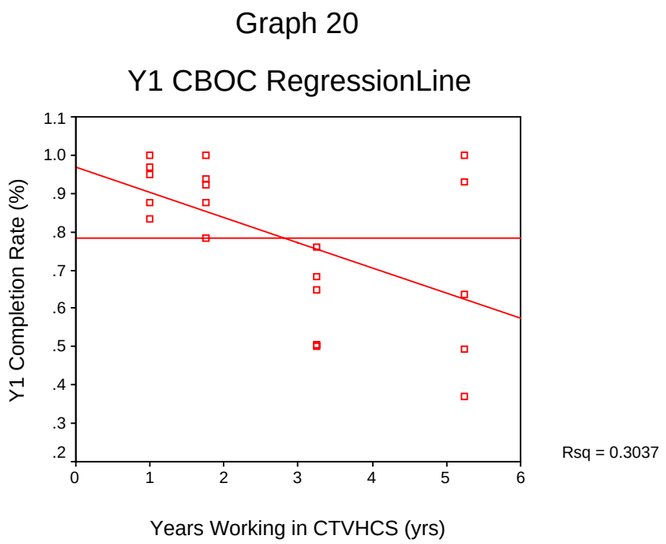
Y2 Correlation Coefficients

	Prostate	Mammo	Ace Inhibitor	Aspirin Rx	Pneumo Vac
Comm. Based Clinic n = 4 clinicians	EOD = -.156 YOMS = .087 FMG = .333 **Gender = 1.000**** Prov Prof = -.830 Pats/Day = -.547 MD = .333 DO = -.333 PA = NA APN = NA **Bd Cert = 1.00**** Age = -.295	EOD = -.156 YOMS = .088 FMG = .333 **Gender = 1.000**** Prov Prof = -.811 Pats/Day = -.557 MD = .333 DO = -.333 PA = NA APN = NA **Bd Cert = 1.000**** Age = -.295	EOD = -.885 YOMS = -.755 FMG = -.577 Gender = .577 Prov Prof = -.307 Pats/Day = -.989 MD = -.577 DO = .577 PA = NA APN = NA Bd Cert = .577 **Age = -.948***	EOD = -.644 YOMS = -.552 FMG = -.333 Gender = .333 Prov Prof = -.600 Pats/Day = -.690 MD = -.333 DO = .333 PA = NA APN = NA Bd Cert = .333 Age = -.613	EOD = -.855 YOMS = -.755 FMG = -.577 Gender = .577 Prov Prof = -.307 Pats/Day = -.986 MD = -.577 DO = .577 PA = NA APN = NA Bd Cert = .577 **Age = -.948***
Satellite Clinic n = 14 clinicians	EOD = .070 YOMS = -.153 FMG = -.113 Gender = .207 Prov Prof = .150 Pats/Day = -.020 MD = -.531 **DO = 1.000**** PA = NA APN = -.113 Bd Cert = .077 Age = -.256	EOD = -.117 YOMS = .324 FMG = .059 Gender = .344 Prov Prof = -.131 Pats/Day = -.157 MD = -.251 DO = .320 PA = NA APN = .059 Bd Cert = -.320 **Age = .571***	EOD = -.233 YOMS = .330 FMG = -.113 Gender = .207 Prov Prof = -.003 Pats/Day = -.111 MD = .145 DO = -.077 PA = NA APN = -.113 Bd Cert = .077 Age = .285	EOD = .000 YOMS = .000 FMG = .000 Gender =.000 Prov Prof = .000 Pats/Day = .000 MD = .000 DO = .000 PA = NA APN = .000 Bd Cert = .000 Age = .000	EOD = -.272 YOMS = -.052 FMG = -.213 Gender = .389 Prov Prof = -.271 Pats/Day = -.094 MD = -.152 **DO = .531*** PA = NA APN = -.213 Bd Cert = .145 Age = -.191
Medical Center n = 27 clinicians	EOD = .170 YOMS = .341 FMG = .017 Gender = .045 Prov Prof = -.024 Pats/Day = .141 MD = .197 DO = NA **PA = -.503**** **APN = .293**** Bd Cert = .197 **Age = .355***	EOD = -.011 **YOMS = .321*** FMG = .069 Gender = .182 Prov Prof = -.173 Pats/Day = -.082 MD = .104 DO = NA PA = -.320 APN = .217 Bd Cert = -.071 Age = .279	**EOD = .367*** **YOMS = .659**** FMG = .316 **Gender = .419*** Prov Prof = -.075 Pats/Day = .137 MD = .418 DO = NA PA = -.295 APN = -.250 Bd Cert = -.299 **Age = .536****	EOD = .055 YOMS = .283 FMG = .107 Gender = .210 Prov Prof = .122 Pats/Day = -.244 MD = .189 DO = NA PA = .000 APN = -.250 Bd Cert = -.120 Age = .106	**EOD = .427*** **YOMS = .416*** FMG = .033 Gender = -.038 Prov Prof = -.078 Pats/Day = .035 MD = .276 DO = NA PA = -.224 APN = -.131 Bd Cert = -.063 **Age = .469***

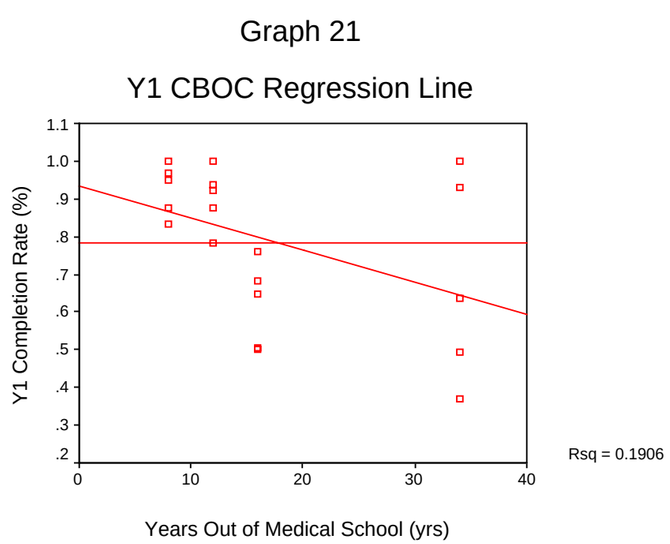
* correlation significant, p<=.05 **correlation significant, p<=.01

Graphs 20 –23. Micro Analysis. Regression Lines for CBOC Y1, Completion Rate (%) and Each Significant Correlation

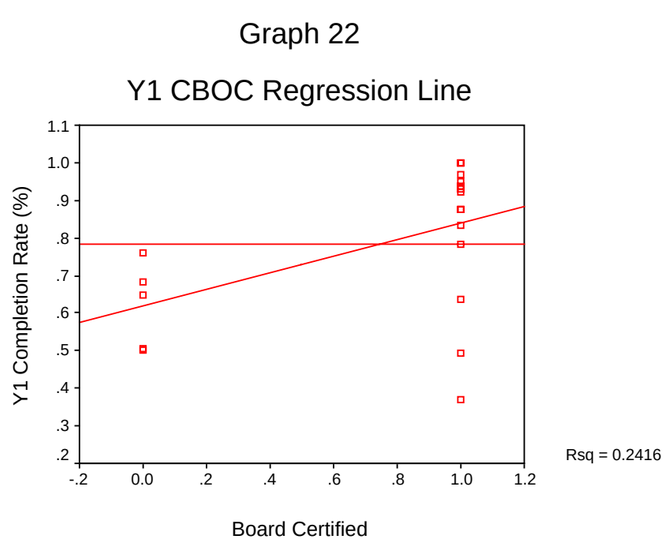
Graph 20



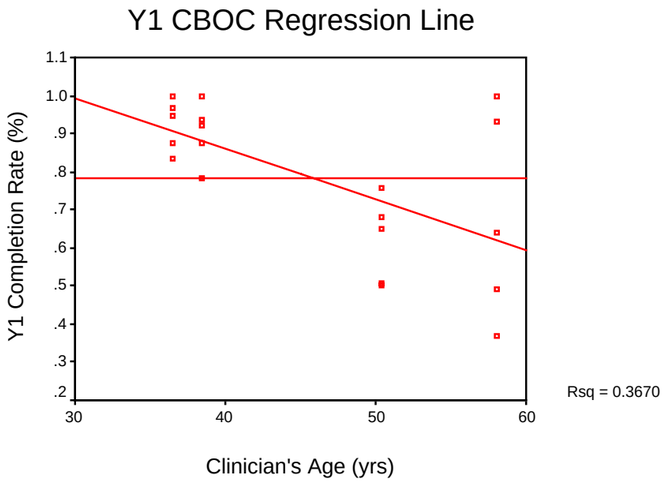
Graph 21



Graph 22

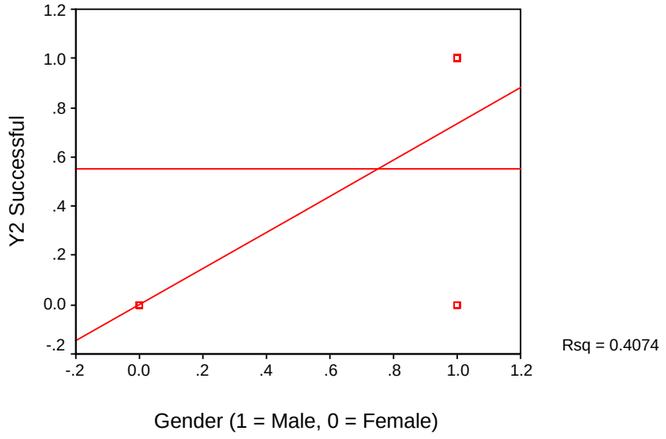


Graph 23

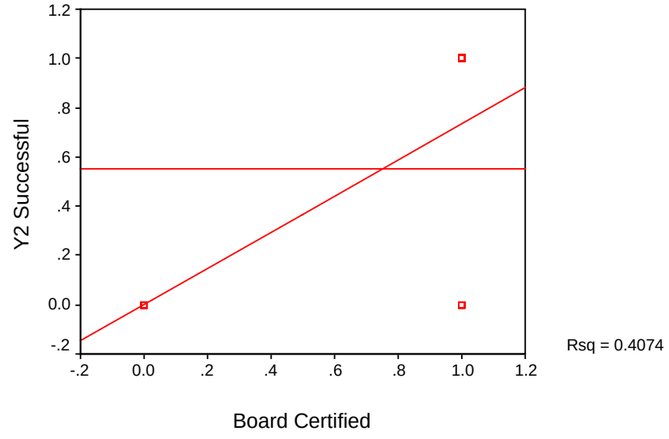


Graphs 24 – 26. Micro Analysis. Regression Lines for CBOC Y2, Successful and Each Significant Correlation

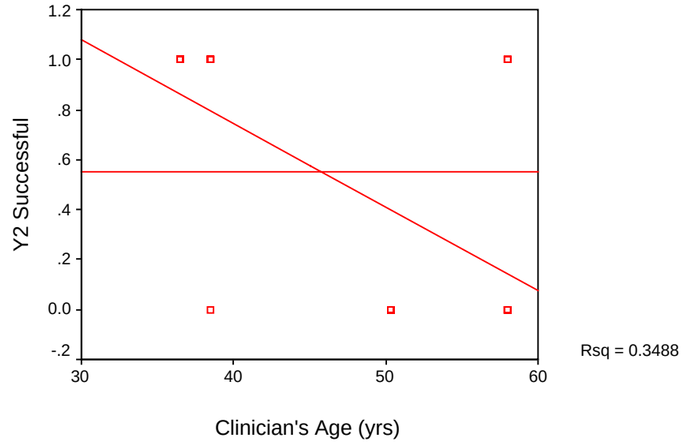
Graph 24



Graph 25

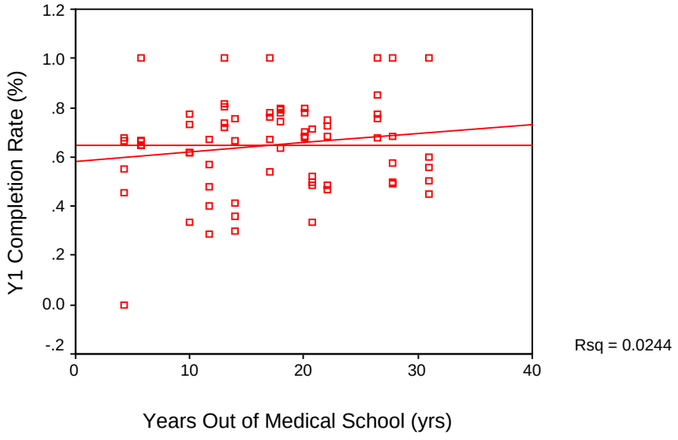


Graph 26

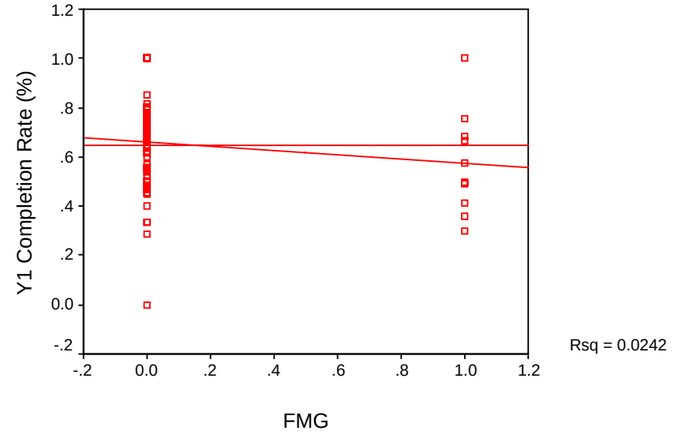


Graphs 27 – 30. Micro Analysis. Regression Lines for SOC Y1 Completion Rate (%) and Y2, Successful and Each Significant Correlation

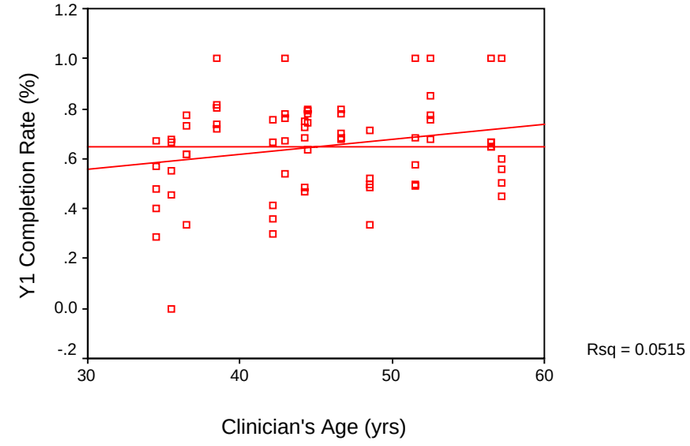
Graph 27



Graph 28



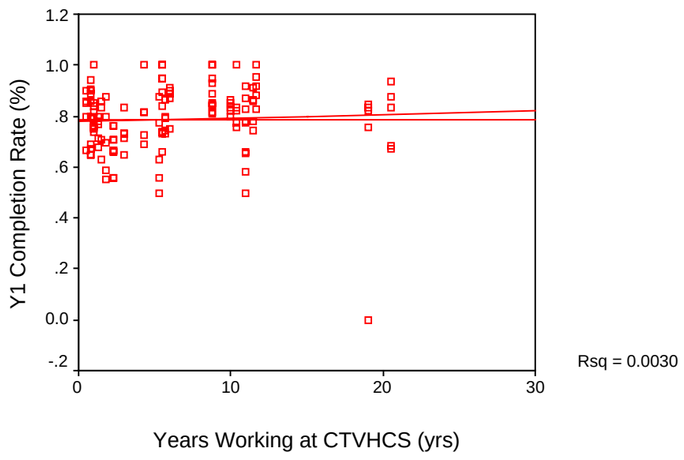
Graph 29



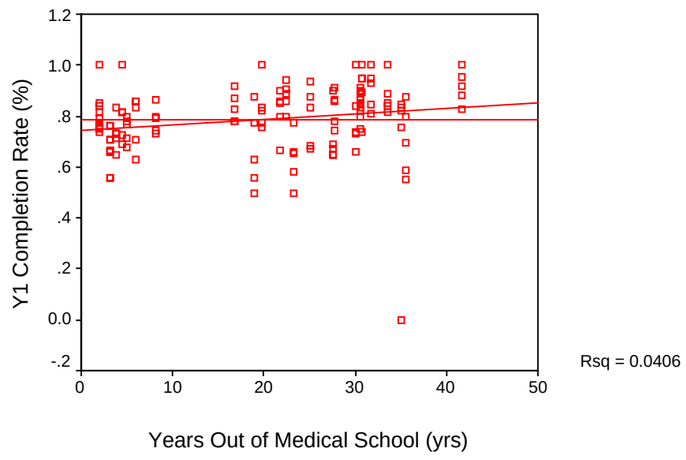
Graph 30

Graphs 31 – 36. Micro Analysis. Regression Lines for MC Y1 Completion Rate (%) and Y2, Successful and Each Significant Correlation

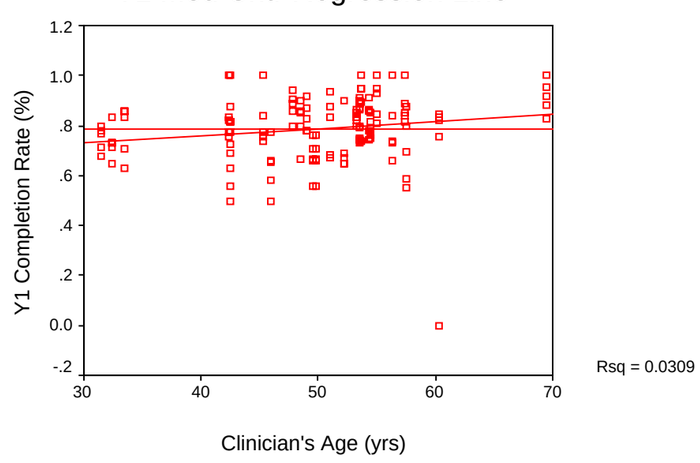
Graph 31



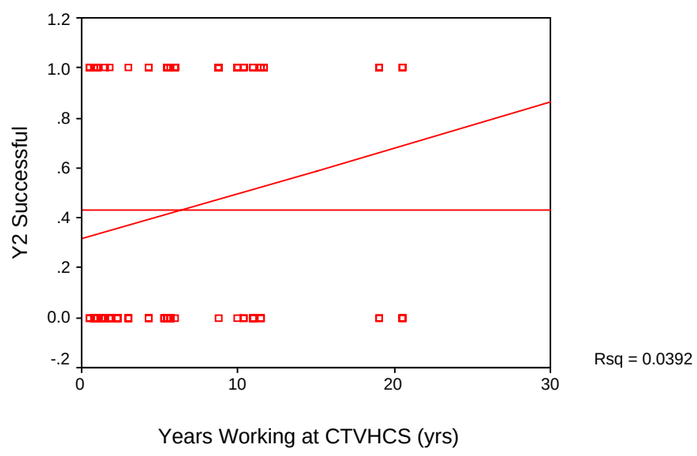
Graph 32



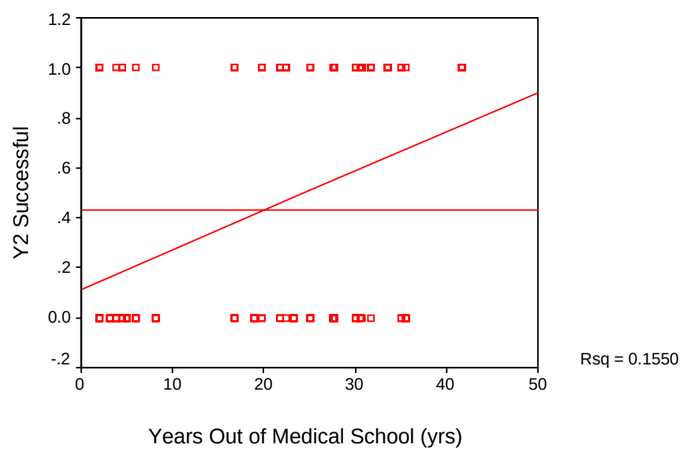
Graph 33



Graph 34



Graph 35



Graph 36